REMARKS

Claims 1-24 are pending in the application.

Claims1 and 16 have been amended in order to more particularly point out, and distinctly claim the subject matter to which the Applicants regard as their invention. It is believed that this Amendment is fully responsive to the Office Action dated **October 4, 2002**.

Allowable Subject Matter

The indication of allowable subject matter in claims 10-11 and 19-20 is noted with appreciation. Accordingly, new claims 21-24 are added.

New claim 21 incorporates therein the subject matter of claims 1 and 10.

New claim 22 incorporates therein the subject matter of claims 1, 10 and 11.

New claim 23 incorporates therein the subject matter of claims 1, 12 and 19.

New claim 24 incorporates therein the subject matter of claims 1 and 20.

Allowance of these claims is respectfully requested.

Claim Rejections under 35 USC §103

Claim 1 has been rejected under 35 USC §103(a) as being unpatentable over Konno (U.S. Patent No. 5,834,486) in view of Hoffmeister (U.S. Patent 5,668,509).

Independent claim 1, as amended, as positively recited:

> "1. (Amended) A high frequency semiconductor device comprising:
> a semiconductor substrate;

at least one active element formed on said semiconductor substrate;
a ground plate connected to [the] a ground potential, said ground plate being provided above said active element;
at least one insulating interlayer;
a plurality of line [conductor] conductors provided above said ground plate, with said at least one insulating interlayer provided therebetween;
at least one terminal for connecting to the exterior; and
a shield plate provided above [the] a highest layer of the plurality of line [conductor] conductors, with said at least one insulating interlayer provided therebetween, said shield plate being connected to the ground potential and covering the plurality of line conductors.

Independent claim 1 is supported by way of an example in Figure 5, where there is indeed shown a high frequency semiconductor device comprising a semiconductor substrate 1; at least one active element (page 7, line 24) formed on said semiconductor substrate 1; a ground plate 3 connected to a ground potential, said ground plate 3 being provided above said active element; at least one insulating interlayer 4; a plurality of line conductors 5 provided above said ground plate 3, with said at least one insulating interlayer 4 provided therebetween; at least one terminal 7 for connecting to the exterior; and a shield plate 7 provided above a highest layer of the plurality of line conductors 5, with said at least one insulating interlayer 4 provided therebetween, said shield plate 7 being connected to the ground potential and covering the plurality of line conductors 5.

In rejecting the claimed invention, the outstanding Office action has specifically stated that:

"Regarding Claims 1, Konno discloses an integrated circuit device having signal wiring structure of ultrahigh-speed performance where the integrated circuit device has a substrate, a plurality of circuit elements arranged on the substrate and having terminals, a plurality of signal lines connected between the terminals of the circuit elements or between the terminals and external connection terminals and a ground line provided close to the signal lines to determine a transmission characteristics of the signal lines, ground line including a high-potential power source line and a low-potential power source line, the high potential power source line and low-potential

power source line being vertically separated by a dielectric layer. Konno does not specifically disclose the shield plate structure. However, Hoffmeister et al. disclose a modified coaxial to grounded coplanar waveguide vertical solderless interconnects for stack MIC assemblies where solderless interconnect provides a transition from a GCPW in a horizontal plant to a vertical plane. The modified coaxial line has a portion of the outer shield removed from the front, and is placed vertically on the center conductor of a GCPW. The coaxial shield connects both ground planes of the GCPW. It would have been obvious to one of having ordinary skill in the art at the time the invention was made to include shield structure in Konno as taught by Hoffmeister in order to provide a better ground protection for the semiconductor device."

The Applicant agrees with the Office assessed shortcoming of Konno. Regarding remaining portion of the rejection, while it appears that it attempts to describe Konno and Hoffmeister, this description does not seem to be of any relevance to the claimed invention, because the description fails to address the specific elements and structural recitations of the claimed invention. To assist the Office in more specifically identifying and communicating where in the prior art the claimed elements and the claimed structural recitations are either disclosed or taught in the prior art, either singly or in combination, the following independent claim 1 with parenthetical blanks are submitted for the convenience of the Office.

1. (Amended) A high frequency semiconductor device

( ) comprising:

a semiconductor substrate ( );

at least one active element ( ) formed on said semiconductor substrate

( );

a ground plate ( ) connected to a ground potential ( ), said ground plate ( ) being provided above said active element ( );

at least one insulating interlayer ( );

a plurality of line conductors ( ) provided above said ground plate ( ), with said at least one insulating interlayer ( ) provided therebetween;

at least one terminal ( ) for connecting to the exterior ( ); and

a shield plate ( ) provided above a highest layer of the plurality of line conductors ( ), with said at least one insulating interlayer ( ) provided therebetween, said shield plate ( ) being connected to the ground potential ( ) and covering the plurality of line conductors ( ).

It should be noted that formulating a *prima facie* case of obviousness is far more than going through various prior art reference to pick and choose among isolated disclosure to reject the claimed invention. Section 2143 of the MPEP has specifically stated that:

> "To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference must teach or

> suggest all the claimed limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 466, 20 USPQ2d 1438 (Fed. Cir. 1991)."

Therefore, it is both a court position and a Patent Office position that to establish a *prima facie* case of obviousness, 1) there **must be** some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings; 2) there **must be** a reasonable expectation of success; and 3) the teaching or suggestion to make the claimed combination and the reasonable expectation of success **must both be** found in the prior art, and not based on applicant's disclosure.

Therefore, should the Office either be unable to identify each and every aspect of the above-mentioned claimed features after taking full consideration of the asserted prior art in a way exactly applied in the outstanding Office action, or the Office recognizes that the rejection simply does not arise to a level objectively fulfilling all three criteria of establishing a *prima facie* case of obviousness, it is respectfully submitted that the obviousness rejection is defective and allowance of the claimed invention is requested.

Claims 2-5 are rejected under 35 USC §103(a) as being unpatentable over Konno in view of Hoffmeister further in view of Rahim (U.S. Patent No. 6,362,525).

In rejecting claims 2-5 of the claimed invention, the outstanding Office Action has stated in its entirety that:

> "Regarding Claims 2-5, in combination Konno and Hoffmeister disclose all the claimed subject matter except the bonding structure. However, Rahim discloses a circuit structure including a passive element formed within a grid array substrate and method for making the same where the bonding structure is disclosed.
>
> It would have been obvious to one of having ordinary skill in the art at the time the invention was made to include the bonding structure in Konno and Hoffmeister combination as taught by Rahim in order to provide a more reliable semiconductor device."

The Applicant is unclear as to where in Konno and Hoffmeister disclose all the claimed subject matter except the boding structure. To assist the Office in more specifically identifying and communicating where in the prior art the claimed elements and the claimed structural recitations are either disclosed or taught in the prior art, either singly or in combination, the following claims 2-5 with parenthetical blanks are submitted for the convenience of the Office.

2. A high frequency semiconductor device according to Claim 1, wherein said at least one terminal ( ) is a wire-bonding pad ( ).

3. A high frequency semiconductor device according to Claim 2, wherein said shield plate ( ) has an opening ( ) in an area in which the said wire-bonding pad is positioned ( ).

4. A high frequency semiconductor device according to Claim 2, wherein said wire-bonding pad ( ) is provided on said shield plate ( ).

5. A high frequency semiconductor device according to Claim 1, wherein said shield plate substantially covers the entirety of said semiconductor substrate ( ).

Should it become apparent that each element and structural recitation of the claimed invention is not disclosed or taught in the asserted prior art, either singly or in combination, it is respectfully submitted that the claimed invention is not rendered obvious by the asserted prior art.

Reconsideration and withdrawal of this rejection are then respectfully requested.

Claims 6-9 are rejected under 35 USC §103(a) as being unpatentable over Konno in view of Hoffmeister further in view of Rahim and further in view of McClanahan et al. (U.S. Patent No. 5,396,397).

In rejecting claims 6-9 of the claimed invention, the outstanding Office Action has specifically stated that:

> "Regarding Claims 6-9, Konno, Hoffmeister, and Rahim combination disclose all the claimed subject matter except they specifically fail to disclose the viahole structure. However, McClanahan et at show a field control and stability enhancement in multi-layer, three- dimensional structures where the unitized multilayer circuit structures including basic substrate insulating layers and dielectric field control layers further including the viahole structure is disclosed.
>
> It would have been obvious to one of having ordinary skill in the art at the time the invention was made to include the viahole structure in Konno, Hoffmeister, and Rahim combination as taught by McClanahan et al. in order to provide a better interconnection."

The Applicant is unclear as to where in Konno, Hoffmeister and Rahim disclose all the claimed subject matter except the viahole structure. To assist the Office in more specifically identifying and communicating where in the prior art the claimed elements and the claimed structural

recitations are either disclosed or taught in the prior art, either singly or in combination, the following claims 6-9 with parenthetical blanks are submitted for the convenience of the Office.

6. A high frequency semiconductor device according to Claim 1, further comprising:

a plurality of throughholes ( ) formed in the periphery ( ) of said shield plate ( ) so as to surround an inner area ( ) excluding the periphery ( ), the throughholes ( ) reaching said ground plate ( ); and

internal conductors ( ) provided in the throughholes ( ), said internal conductors ( ) connecting said shield plate ( ) and said ground plate ( ).

7. A high frequency semiconductor device according to Claim 1, wherein said at least one terminal ( ) leads from the back ( ) of said semiconductor substrate ( ).

8. A high frequency semiconductor device according to Claim 1, wherein said at least one terminal ( ) is connected to the surface ( ) of said semiconductor substrate ( ) by a viahole ( ) penetrating said semiconductor substrate ( ).

9. A high frequency semiconductor device according to Claim 7, wherein said at least one terminal ( ) is a flip chip pad ( ).

Should it become apparent that each element and structural recitation of the claimed invention is not disclosed or taught in the asserted prior art, either singly or in combination, it is respectfully submitted that the claimed invention is not rendered obvious by the asserted prior art.

Reconsideration and withdrawal of this rejection are then respectfully requested.

Claims 12-18 are rejected under 35 USC §103(a) as being unpatentable over Konno in view of Hoffmeister in view of Rahim in view of McClanahan et al. and further in view of Ishikawa et al. (U.S. Patent No. 6,411,181).

In rejecting claims 6-9 of the claimed invention, the outstanding Office Action has specifically stated that:

> "Regarding Claims 12-18, in combination Konno, Hoffmeister, Rahim and McClanahan et al. disclose all the claimed subject matter except they specifically fail to disclose the antenna structure, However, Ishikawa et al. disclose a dielectric resonator, inductor, capacitor, dielectric filter, oscillator, and communication device where the antenna structure is disclose.
>
> It would have keen obvious to one of having ordinary skill in the art at the time the invention was made to include the antenna structure in Konno, Hoffmeister, Rahim, and McClanahan et al. combination as taught by Ishikawa et al. in order to provide a semiconductor device that can be used for communication purposes."

The Applicant is unclear as to where in Konno, Hoffmeister, Rahim and McClanahan et al. disclose all the claimed subject matter except the antenna structure. To assist the Office in more

specifically identifying and communicating where in the prior art the claimed elements and the claimed structural recitations are either disclosed or taught in the prior art, either singly or in combination, the following claims 12-18 with parenthetical blanks are submitted for the convenience of the Office.

12. A high frequency semiconductor device according to Claim 1, wherein said terminal ( ) is an antenna ( ).

13. A high frequency semiconductor device according to Claim 12, wherein said shield plate ( ) has an opening ( ) in a portion ( ) corresponding to said antenna ( ).

14. A high frequency semiconductor device according to Claim 12, wherein a terminal ( ) for electrically connecting to the exterior ( ) is further provided on the back ( ) of said semiconductor substrate ( ).

15. A high frequency semiconductor device according to Claim 14, wherein said terminal ( ) is connected to the surface ( ) of said semiconductor substrate ( ) by a viahole ( ) penetrating said semiconductor substrate ( ).

16. (Amended) A high frequency semiconductor device ( ) according to Claim 14, wherein said terminal ( ) is a flip chip bonding electrode ( ).

17. A high frequency semiconductor device according to Claim 12, wherein said ground plate ( ) is used as an antenna grand plane ( ) in said antenna ( ).

18. A high frequency semiconductor device according to Claim 12, wherein said antenna ( ) is provided on said shield plate ( ), and said shield plate ( ) is used as an antenna grand plane ( ).

Should it become apparent that each element and structural recitation of the claimed invention is not disclosed or taught in the asserted prior art, either singly or in combination, it is respectfully submitted that the claimed invention is not rendered obvious by the asserted prior art.

Reconsideration and withdrawal of this rejection are then respectfully requested.

Conclusion

In view of the aforementioned amendments and accompanying remarks, all of the pending claims are in condition for allowance, which action, at an early date, is requested.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicants undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

Attached hereto is a marked-up version of the changes made to claims 1 and 16 by the current amendment. The attached page is captioned "**Version with markings to show changes made**."

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,
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PATENT TRADEMARK OFFICE

Enclosures: Version with markings to show changes made
Request for Approval of Drawing Changes w/Fig 4 marked in red

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VERSION WITH MARKINGS TO SHOW CHANGES MADE 10/090,614

IN THE DRAWINGS:

Please amend Fig. 4 as indicated in the attached Request for Approval of Drawing Changes.

IN THE SPECIFICATION:

Page 11, second complete paragraph, has been amended as indicated below:

As shown in Figs. 9 and 10, the pads 6 are connected to [an area of the shield plate 7 which corresponds to the element-arranged area by forming areas] the line conductors 5 in an outside area of the shield plate 7, extending through areas having no throughhole [8, and providing line conductors 5].

IN THE CLAIMS:

Please amend claims 1 and 16 as follows:

1. (Amended) A high frequency semiconductor device comprising:

a semiconductor substrate;

at least one active element formed on said semiconductor substrate;

a ground plate connected to [the] a ground potential, said ground plate being provided above said active element;

at least one insulating interlayer;

a plurality of line [conductor] conductors provided above said ground plate, with said at least one insulating interlayer provided therebetween;

at least one terminal for connecting to the exterior; and

a shield plate provided above [the] a highest layer of the plurality of line [conductor] conductors, with said at least one insulating interlayer provided therebetween, said shield plate being connected to the ground potential and covering the plurality of line conductors.

16. (Amended) A high frequency semiconductor device according to Claim 14, wherein said terminal is a flip chip bonding electrode.